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Variation of the Limiting Viscosity Number With the Concentration of the Initiator Used

by

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Variation of the Limiting Viscosity Number With the Concentration of the Initiator Used

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SUMMARY

A relation between the limiting viscosity number and the initiattor concentration for the polyacrylonitrile and polymethyl acrylate has been drived as this :

$[\eta] = A / [I]^a$

For this purposes the purified acrylonitrile has been polymerized by using Bz_2O_2 as the initiator. The limiting viscosity numbers of this polymer have been measured. The experimental data for the polymethylacrylate have been taken from reterence [1]. By plotting the limiting viscosity numbers against the concentration of the initiator used, a relationship showing the variation of the limiting viscosity number with the initiator concentration has been obtained.

All the experimental results are given in Table I, Table II and Table III

TABLE I

Polymethyl acrylate prepared at 60° C

[I] (AZDN) (mole litre^{-1})	$[\eta]$ (dl g^{-1})	Log [I]	log $[\eta]$
4.06×10^{-4}	5.90	—3.39	0.77
3.06×10^{-4}	6.10	—3.51	0.79
2.03×10^{-4}	6.30	—3.69	0.80
1.02×10^{-4}	6.60	—3.99	0.82
0.51×10^{-4}	7.05	—4.29	0.85

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TABLE II

Polymethyl acrylate prepared at 60° C.

[I] (Bz_2O_2) (mole litre^{-1})	[η] (dl g^{-1})	log [I]	log [η]
13.4 x 10^{-4}	5.80	—2.87	0.76
5.36 x 10^{-4}	6.20	—3.27	0.79
2.68 x 10^{-4}	6.40	—3.57	0.81
1.34 x 10^{-4}	6.80	—3.87	0.83
0.67 x 10^{-4}	7.15	—4.17	0.85

TABLE III

Polyacrylonitrile prepared at 60° C.

[I] (Bz_2O_2) (mole litre^{-1})	[η] (dl g^{-1})	log [I]	log [η]
5.36 x 10^{-3}	10.50	—2.27	1.02
2.65 x 10^{-3}	11.40	—2.58	1.06
1.32 x 10^{-3}	12.50	—2.88	1.10
0.67 x 10^{-3}	13.00	—3.17	1.14

The graphs drown from the above tables are shown in the following figures (1,2,3,).

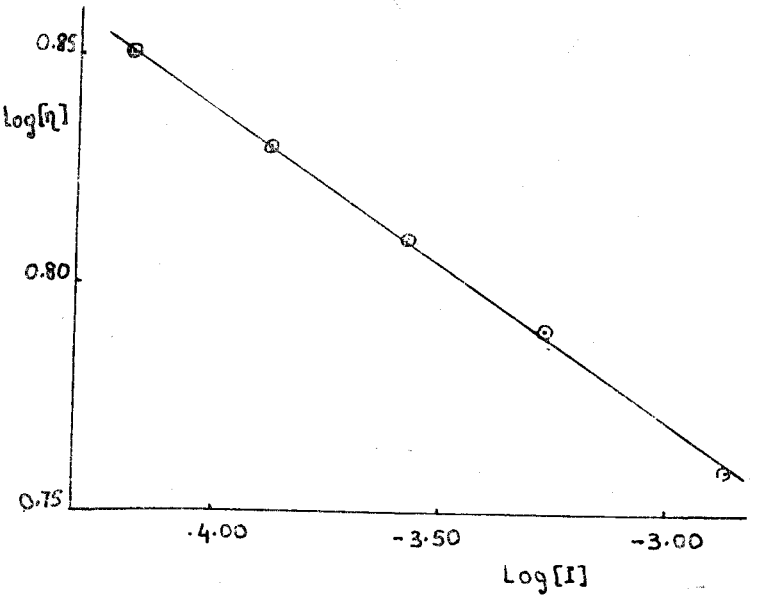

Figure 1: A log - log plot of the limiting viscosity number against initiator concentration; data for polymethyl acrylate prepared with benzoyl peroxide.

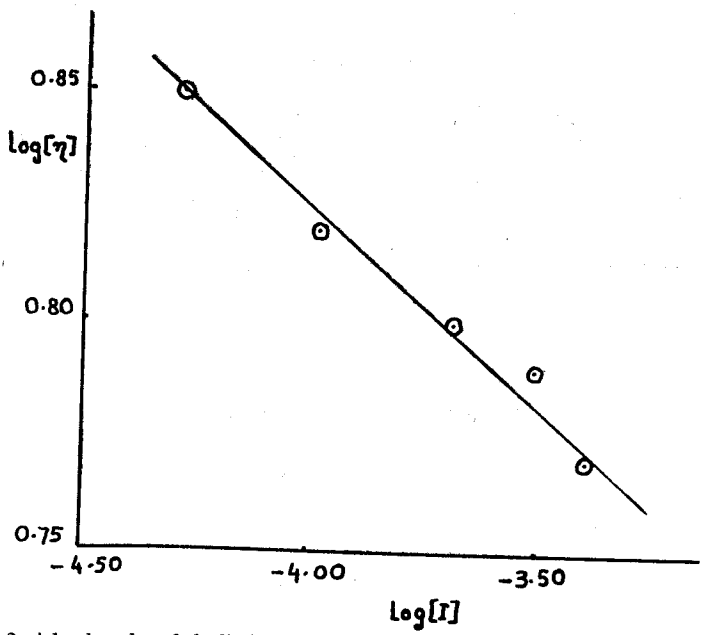

Figure 2: A log-log plot of the limiting viscosity number against initiator concentration; data for polymethyl acrylate prepared with azo-bis-izobutyronitrile.

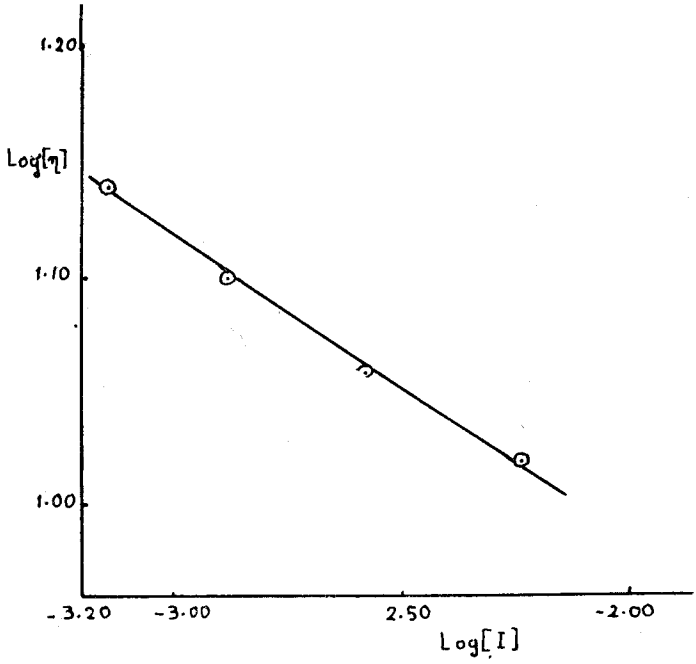

Figure 3: A log- log plot of the limiting viscosity number against initiator concentration; data for polyacrylonitrile prepared with benzoyl peroxide.

It is seen from the figüres (1,2,3) that there is a linear relationship between log $[\eta]$ and log [I], which is given as this:

$$\log [\eta] = \log A - a \log [I]$$

where A and a are constant for the polymer and the initiator used.

ÖZET

Bu çalışmada polimetil akrilat ve poliakrilonitrilin limit viskozite sayısının (intrinsik viskozitesi) başlatıcı konsantrasyonu ile

$$[\eta] = A/ [I]^a$$

bağıntısına uygun bir şekilde değiştiği gösterilmiştir.

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